

BOTANY.—*Centrolobium* (*Leguminosae*): *Validation of a specific name and a brief review of the genus.* VELVA E. RUDD, U. S. National Museum. (Communicated by Jason R. Swallen.)

In October 1918, Dr. J. N. Rose and his son, George Rose, collected specimens of an Ecuadorian timber tree, a member of the legume family, known locally and in the lumber trade as *amarillo*, *amarillo de Guayaquil*, and *amarillo lagarto*. The resulting herbarium sheets were inscribed "*Centrolobium ochroxylum*, n. sp.," and the name was subsequently used by various writers, including Record (*Timbers of Tropical America*, 291–293. 1924; *Timbers of the New World*, 242–243. 1943), Rimbach (*Tropical Woods* 31: 4. 1932), and Acosta Solis (*Tropical Woods* 89: 12, 23, 33. 1947).

A valid taxonomic description of that species has apparently never been published, a situation which was recently brought to my attention by W. A. Dayton, of the U. S. Forest Service.

It is the purpose of this paper to validate the specific name *Centrolobium ochroxylum*, proposed by Dr. Rose, and to present a brief review of the genus.

The generic name *Centrolobium* was proposed by Martius and published by Bentham (*Ann. Mus. Vind.* 2: 95. 1838). It is based on *Nissolia robusta* Vell. (*Fl. Flum.* 298. 1825. *Icon.* 7: tab. 85. 1835), and, therefore, *Centrolobium robustum* (Vell.) Mart. ex Benth. is the type of the genus. Six additional species of *Centrolobium* have been proposed, two of which have also been treated as varieties.

The genus *Centrolobium* is composed of trees about 10–30 meters tall, the trunks being as much as 1 meter in diameter, commonly buttressed at the base and the bark grayish and smooth, or fissured. When cut, the stems and roots exude a reddish sap. Most young parts are densely brownish-pubescent and dotted with reddish-orange resinous punctae. The stipules are caducous, deltoid to broadly orbiculate, acute, about 1–2 cm long. The leaves are large, imparipinnate, 7–21-foliolate, the leaflets oblong-ovate, acuminate to obtuse, entire, punctate below, pubescent to glabrous, membranaceous to subcoriaceous, pinnately veined, the costa

essentially central. The bracts are stipule-like but smaller. The flowers are papilionaceous, borne in large terminal panicles, the corollas 1–2 cm long, yellowish, sometimes suffused with red or violet, glabrous, the standard spatulate or obovate, with callosities near the base of the blade, the calyx densely pubescent, turbinate-campanulate with 4 subequal lobes, the lobe opposite the standard emarginate or 2-parted. The fruits are large, 1–3(–4)-seeded, samaroid legumes, the style usually persisting as a stout spine (stylar spine), the body of the fruit spherical or elliptical, 1.5–5 cm in diameter, echinate with spines up to about 4 cm long, the wings obliquely spatulate or cultriform, about 5–18 cm long measured along the median longitudinal axis, 2–9 cm wide.

The wood of the various species of *Centrolobium* is richly colored, usually yellowish or orange, with streaks of red, purple, or black, and takes a high satiny finish. It is of value for furniture, flooring, cooperage, shipbuilding, railway ties, mine timbers, and general construction. According to Record (op. cit.) it is known to the trade by a number of names, in the United States principally as canary wood, porcupine wood, and zebra wood.

The known geographic range of the genus is restricted to South America, with a slight extension into Panama (Fig. 1).

Although *Centrolobium* is a genus of economic importance, its occurrence apparently is not too common within its range, and the representation by herbarium specimens is remarkably poor. It is hoped that more collections, as complete as possible, will be forthcoming.

In addition to the material at the U. S. National Herbarium (US), specimens of *Centrolobium* were examined at the Chicago Museum of Natural History (F) and the New York Botanical Garden (NY). To the curators of those institutions the writer wishes to express her thanks for their courtesy. The initials of the herbaria, as cited, follow those given by Lanjouw and Stafleu (*Index Herbariorum*, 1952).



FIG. 1. The known geographic range of *Centrolobium* (M—*C. minus*; O—*C. ochroxylum*; P—*C. paraense* var. *paraense*; PO—*C. paraense* var. *orinocense*; R—*C. robustum*; T—*C. tomentosum*; Y—*C. yavizanum*).

The following key to species, based on admittedly inadequate material, is intended to facilitate comparison of the previously described taxa as well as to place the species which is described as new in this paper.

KEY TO SPECIES OF CENTROLOBIUM

- Stylar spine (persistent style) with the wing adherent almost to the apex, or the spine weak and not more than 1 cm long; leaves (9-)13-21-foliolate, the leaflets commonly ovate-oblong, not more than 6 cm wide.
  - Stipe of fruit about 2.5 cm long; leaflets submembranaceous (Panama; Colombia)
    - 4. *C. yavizanum*
  - Stipe of fruit less than 2 cm long; leaflets chartaceous or subcoriaceous.
    - Fruit essentially sessile; pedicels 3-5 mm long, 2-3 mm thick (southeastern Brazil)
      - 3. *C. tomentosum*
    - Fruit stipitate, the stipe (6-)8-15 mm long; pedicels 5-10 long, 1-2 mm thick.
      - Body of fruit 4-8 cm long, 3-5 cm broad, the spines fairly rigid, mostly 2-4 cm long,

- the stylar spine 2.5-5 cm long; wing 12.5-16 cm long, 6-9 cm wide (southeastern Brazil).....1. *C. robustum*
- Body of fruit 2.5-3 cm long, 1.5-2.5 cm wide, the spines fine, rather weak, commonly less than 2 cm long, the stylar spine 1-2 cm long, often inconspicuous; wing 6-13 cm long, 2-6 cm wide (eastern Bolivia; southeastern Brazil).....2. *C. minus*
- Stylar spine free from the wing except for basal portion 1 cm long or less; leaves 7-15-foliolate, the leaflets ovate-elliptic, frequently as much as 10-14 cm wide.
  - Apex of stylar spine recurved (Ecuador)
    - 5. *C. ochroxylum*
  - Apex of stylar spine ascending or perpendicular to the longitudinal axis of the wing.
    - Leaflets subcordate, pubescent, sometimes glabrescent (British Guiana; eastern Venezuela; northern Brazil)
      - 6a. *C. paraense* var. *paraense*
      - Leaflets rounded at base to subcordate, subglabrous or glabrate (Panama; Trinidad, cultivated ?; Venezuela; Colombia)
        - 6b. *C. paraense* var. *orinocense*

1. *Centrolobium robustum* (Vell.) Mart. ex Benth. Ann. Mus. Vind. 2: 95. 1838. *Nissolia robusta* Vell. Fl. Flum. 298. 1825. Icon. 7: tab. 85. 1835. *Centrolobium robustum* var. *macrochaete* Mart. ex Benth. in Mart. Fl. Bras. 15<sup>1</sup>: 263. 1862.

Tree about 30 meters tall; leaves (9-)13-21-foliolate, the petiole and rachis subglabrous, slender, commonly less than 5 mm thick at base of petiole, the leaflets chartaceous to subcoriaceous, moderately pubescent to subglabrous, ovate-oblong, 4-10 cm long, 1.5-6 cm wide, acuminate, the base obliquely rounded to subcordate; pedicels about 5-6 mm long and 1-1.5 mm thick; legume with stipe 1 cm long, the body of the fruit 4-8 cm long, 3-5 cm broad, the spines fairly rigid, mostly 2-4 cm long, the stylar spine 2.5-5 cm long, ascending, adherent to the wing along 2 cm of its length or more, any protruding portion weak and easily broken, the wing 12.5-16 cm long, 6-9 cm wide.

Distribution: Known only from Brazil, in eastern Bahia south to northern São Paulo.

- BRAZIL: (Local name, *putumuju*)
  - Bahia: [Grungogi] "Grongogy basin", Curran 296 (US). Between "Jiquey e Iracema," Fröes 20171 (NY).
  - Rio de Janeiro or Distrito Federal: Vellozo (Icon. 7: tab. 85, presumably based on type); Riedel & Luschnath 448 (US). Macahe, Riedel & Luschnath 464 (NY, US).
  - São Paulo: Ubatuba, Guillemín 592 (F).

Included in this species are the collections with the largest fruits and the smallest leaflets.

2. *Centrolobium minus* Presl, Bot. Bemerk. 61. 1844.

*Centrolobium robustum* (Vell.) Mart. ex Benth.  
var *microchaete* Mart. ex Benth. in Mart. Fl. Bras. 15<sup>1</sup>: 263. 1862.

Tree, about 30 meters tall, the trunk about 8 dm in diameter; leaves 13-17-foliolate, the petiole and rachis moderately pubescent to subglabrous, slender, commonly less than 5 mm thick at the base of the petiole, the leaflets subcoriaceous, moderately pubescent to subglabrous, ovate to oblong, 6-10 cm long, 3-5 cm wide, acuminate to obtuse, the base rounded, sometimes obliquely; pedicels 8-10 mm long, 1-2 mm thick; legume with stipe (6-)8-15 mm long, the body of the fruit 2.5-3 cm long, 1.5-2.5 cm wide, the spines fine, rather weak, 1-2 cm long, the stylar spine 1-2 cm long, adherent to the wing along its entire length or nearly so, often rather inconspicuous, the wing 6-13 cm long, 2-6 cm wide.

Distribution: Southeastern Brazil and eastern Bolivia.

BOLIVIA:

La Paz: La Asunta, *Krukoff* 10625 (NY).

BRAZIL: (Local names, *arribá*, *lei nova*.)

Espirito Santo: Collantina, *Whitford & Silveira* 72 (US).

Minas Gerais: Capoeira, *E. de Oliveira*, May 6, 1941 (US). Fazenda da Cachoeira, Munic. Tombos, *Mello Barreto* 1509 (F), 1691 (F).

Rio de Janeiro or Distrito Federal: *Luschnath* (tab. 74, Presl. Symb. Bot. 1858, presumably based on type).

Although Martius and Bentham treated this taxon as only varietally distinct from *C. robustum*, I believe that it is more closely related to *C. tomentosum*. For the time being I prefer to consider it as specifically distinct and thus to use Presl's designation of *C. minus*.

3. *Centrolobium tomentosum* Benth. in Hook. Journ. Bot. 2: 66. 1840.

Tree, 20 meters tall or more; leaves 13-17-foliolate, the petiole and rachis pubescent, 5 mm thick or more at base of petiole, the leaflets ovate to elliptic, 8-15 cm long, 4.5-5.5 cm wide, obtuse to acuminate, the base rounded to subcordate, usually oblique, the upper surface pubescent or sometimes glabrate, the lower surface pubescent; pedicels about 3-5 mm long and 2-3 mm thick; legume essentially sessile, the body of the fruit

3.5-4 cm long, 2.5-3.5 cm thick, the spines fine and weak, mostly 1-2 cm long, the stylar spine 3.5-4 cm long, ascending, adherent to the wing almost to the apex, the wing 12-15 cm long, 6-7 cm wide.

Distribution: Known only from southeastern Brazil.

BRAZIL: (Local names, *arribá*, *arribá rosa*.)

Minas Gerais: *Claussen* (photo of type ex K, NY negative, new series no. 2677); *Claussen* 879 (F, NY, isotypes?).

Rio de Janeiro or Distrito Federal: *Sellow* (NY, US). Botanical Garden, *Whitford* 10 (F, NY, US).

São Paulo: São Paulo, in park, *Kuhlmann* 31626 (NY).

Among the specimens of this species are the most densely tomentose of the genus. The character is not constant, however, and some collections are glabrate.

4. *Centrolobium yavizanum* Pittier, Journ. Washington Acad. Sci. 5: 439. 1915.

Tree, 25-30 meters tall; leaves 13-17(-19?)-foliolate, the leaflets (on basis of immature specimens) 6-12 cm long, 3-5.5 cm wide, ovate to elliptical, pubescent, possibly glabrescent, acuminate, rounded to subcordate at base; mature flowers not seen; legume with stipe about 2.5 cm long, the body of fruit 3-3.5 cm long, 2-2.5 cm wide, the spines fine and weak, 1-2 cm long, the stylar spine 1 cm long or less, adherent to wing along about half its length or more, the apical portion free, ascending or perpendicular to long axis of wing, the wing 10-12 cm long, 4.5-5.5 cm wide.

Distribution: In forest, southern Panama and northern Colombia.

PANAMA:

Darien: Between Pinogama and Yaviza, *Pittier* 6572 (NY, US, type).

COLOMBIA: (Local name, *guayacán jobo*.)

Bolívar: Lands of Lobo, *Curran*, in Apr.-May 1916 (US). ? Puerto Berrio, *Haught* 1688 (NY).

The fruits of the first two collections cited differ slightly in wing shape, but in other particulars, including stipe length, which I believe to be a critical diagnostic character, they are essentially the same. The *Haught* specimen, with one leaf and an immature inflorescence, is placed here tentatively on the basis of the shape and number of leaflets.

5. *Centrolobium ochroxylum* Rose ex Rudd,  
sp. nov. FIG. 2

Arbor, decidua, 10–30 m alta; ramuli novelli fulvo-tomentosi, demum glabrescentes, cortice griseo, tronco 5 dm diametro; folia 7–13-foliolata, imparipinnata; foliola ovata, 6–20 cm longa, 5–14 cm lata, apice acuminata vel acuta, basi rotundata vel subcordata, margine integra, foliola terminali saepe maxima, jugis inferioribus brevioribus, tomentosa, glabrata, subtus resinoso-punctata, punctis subrufis vel aureis; flores non vidi; legumen sphaericum, 3–4 cm diametro, dense spinosum, spinis 2–3 cm longis, stipite 1 cm longo, styli vestigio 1.5–2 cm longo, indurato, apice recurvato, ala obliquo-spathulata, 14–17 cm longa, 7–10 cm lata, tomentosa, glabrescente, glanduloso-punctata.

Tree, 10–30 meters tall, deciduous; stems brownish-tomentose when young, glabrescent; mature trunks as much as 5 dm in diameter, the bark gray; stipules caducous, ovate, acute, about 6 mm long, 8 mm wide, tomentose, resinous-punctate; leaves 7–13-foliolate, imparipinnate, the lateral leaflets subopposite, the axis striate, tomentose, glabrescent, 25–45 cm long,

the petiole 10–15 cm long; leaflets 6–20 cm long, 5–14 cm wide, the terminal leaflet often the largest, the basal pair the smallest, ovate, entire, acuminate or acute, the base rounded to subcordate, the upper surface tomentose, glabrate, the lower surface tomentose, glabrate, resinous-punctate with orange-colored dots, the venation pinnate with about 12–16 major secondary veins on each side of the central costa; flowers not seen; legume spherical, 3–4 cm in diameter, spiny, the spines mostly 2–3 cm long, the stipe about 1 cm long, the styler spine about 1.5–2 cm long, recurved, the wing obliquely spatulate 14–17 cm long, 7–10 cm wide, tomentose, glabrescent, resinous-punctate.

Type in the U. S. National Herbarium, no. 1022875, collected at Portovelo (near Zaruma), Province de Oro, Ecuador, October 6–15, 1918, by J. N. Rose and George Rose (no. 23370) Duplicate at NY.

Additional specimens examined:

ECUADOR: (Local names, *amarillo*, *amarillo de Guayaquil*, *amarillo lagarto*.)

Guayas: Milagro, *Johansen* 12 (US).

El Oro: Portovelo, *Hitchcock* 21265 (US).

Junction of Río Ambocas and Río Luis, 10 km south of Portovelo, *Camp* E-585 (NY).  
Piedras, *Little* 6615 (US).

Los Ríos: Pichilingue, *Little* 6486 (F, US).  
Quevado, *Little* 6557 (US).



FIG. 2. *Centrolobium ochroxylum* (leaf and fruit, Rose & Rose 23370).

It is believed by some botanists that *Centrolobium* in Ecuador should be referred to *C. patinense* Pittier, originally described from Panama (in this paper, reduced to synonymy under *C. paraense* var. *orinocense*), and it has been so cited (Holdridge et al., U. S. For. Serv. Publ. 25, 49, 72. 1947). Others have chosen to give it a non-committal designation as *Centrolobium* sp. In the present state of knowledge of the genus and the range of variation of its taxa, it seems desirable to maintain a separate species for the Ecuadorian representatives of *Centrolobium*, although they undoubtedly are very closely related to *C. paraense*.

Acosta-Solis (Tropical Woods 89: 23. 1947), in a list of commercially valuable woods in the Province of Esmeraldas, Ecuador, includes "Amarillo Lagarto Oscuro (*Centrolobium ochroxylum*)" and "Amarillo Lagarto Claro (*Centrolobium ochroxylum*, var.)" I have not as yet seen any material from Esmeraldas, nor do I know what might be referable to two such varieties.

6. *Centrolobium paraense* Tul. Arch. Mus. Par. 4: 87. 1844.

Tree, about 30 meters tall, the mature trunk as much as 1 meter in diameter; leaves 7–15-foliolate, the leaflets 7–24 cm long, 5–14 cm wide, ovate to elliptic, obtuse to acuminate, the base rounded to cordate, the upper surface tomentose, often glabrescent, the lower surface sparingly pubescent to subglabrous; flowers about 12–17 mm long, in terminal panicles; bracts densely brown-tomentose, obovate-rhombic, 8–10 mm long, 6–10 mm wide, acuminate, the bracteoles linear, acute, 6–10 mm long, 1–2 mm wide; calyx brown-tomentose, 10–17 mm long; petals yellow, glabrous, the standard broadly spatulate, about 12–17 mm long, 10 mm wide, retuse, the wings and keel 10–14 mm long; stamens about 10 mm long; fruit with stipe 10–15 mm long, the body of the legume 3.5–5 cm long, 2–3.5 cm wide, the spines 1.5–3 cm long, fine, moderately rigid, the stylar spine about 1.5–2.5 cm long, adherent to the wing only along the basal 7–12 mm, the apex free, ascending or perpendicular to the long axis of the wing, the wing 13–18 cm long, 6–9 cm wide.

6a. *Centrolobium paraense* var. *paraense*.  
*Centrolobium paraense* Tul. Arch. Mus. par. 4: 87. 1844.

Leaves 7–15-foliolate, the leaflets subcordate, tomentose, sometimes glabrescent, often revolute, the terminal leaflet often conspicuously broader and the basal laterals noticeably smaller than average.

Distribution: Trinidad (cultivated?), eastern Venezuela, British Guiana, and northern Brazil.

TRINIDAD: (Local name, porcupine tree.) Port of Spain, Botanic Garden, *Fairchild* 2844 (US); *Mell.*, Aug. 10, 1923 (NY, US).

BRITISH GUIANA: (Local names, *shipuradai*, *kartang*.) "Pirara, &c," *Schomburgk* 314 (F); isotype; photo of isotype ex G, Field Mus. negative no. 28033). Kanuka Mts., A. C. Smith 3207 (F, NY, US). Rupununi R., *Forest Service Brit. Guiana* WB 138 (NY).

VENEZUELA: (Local names, *cartán*, *balaustre*.) Anzoátegui or Sucre: Between Guanta and Los Altos, *Tamayo* 2106 (US). Along Río Querecual, sw of Bergantín, *Steyermark* 61487 (F).

BRAZIL: (Local names, *pão-rainha*, *pau rainha*.) Rio Branco: Serra Grande, *Ducke* 516 (F, NY, US). Between Bôa Vista and Caracarahy, *Frôes* 23055 (US).

6b. *Centrolobium paraense* var. *orinocense* Benth. in Mart. Fl. Bras. 15<sup>a</sup>: 266 (as *orenocense*). 1862.

*Centrolobium patinense* Pittier, Journ. Washington Acad. Sci. 5: 470. 1915.

*Centrolobium orinocense* (Benth.) Pittier, Bol. Tecn. M.A.C. Serv. Bot. Caracas 5: 123. 1944.

Leaves 9–15-foliolate, the leaflets rounded to subcordate, often glabrate, usually fairly uniform in size and shape.

Distribution: In forest, southern Panama, northern Colombia, southeastward to Orinoco region of Venezuela.

PANAMA: (Local name, *amarillo de Guayaquil*.) Darien: Punta Patiño, *Pittier* 6611 (US, type of *C. patinense*).

VENEZUELA: (Local names, *cartán*, *balaustre*.) Guárico: Between Uberito and San Juan de los Morros, *Pittier* 12240 (F, NY, US).

Aragua: Between Villa de Cura and San Juan de los Morros, *Pittier* 11358 (NY, US).

Zulia: San Martín, on Río del Palmar, *Pittier* 10514 (NY, US). Maricaibo, *Cleary*, Oct. 1, 1923 (NY).

Bolívar: "prope Angustura" [Ciudad Bolívar], *Guárico*, May 1851 (photo of type ex K, NY negative, new series no. 2678). La Prisión, Medio Caura, *Ll. Williams* 11646 (F, US). Serranía de Guayapo, Bajo Caura, *Ll. Williams* 11832 (F, US).

COLOMBIA: (Local names, *colorado*, *palo colorado*, *balaustre*.)

Atlántico: Los Pendales, *Dugand* 1126 (F, US). Tocagua, *Bro. Elias* 1580 (F, NY, US).

Bentham distinguished var. "*Orenocense*" from the typical variety by "foliolis glabrioribus basi vix cordatis." However, from the limited amount of material available, these distinctions do not seem to be sharp, and in at least two collections, *Pittier* 6611 and 10514, there is a tendency toward both types of leaflets. As more collections are made, the desirability of reducing the two varieties to synonymy may become more obvious. Maintaining the taxon *orinocense* in specific rank certainly does not seem to be justified.

The type collection of *C. patinense*, consisting of fruits and immature leaves, appears to be essentially the same as material of *C. paraense* var. *orinocense*. Most of the leaflets of *C. patinense* are rounded at the base, but a few are subcordate. The fruits (possibly submature), although slightly smaller than average, are within the size range for *C. paraense*.